COMMENTS AND RESPONSE

In view of the comments below, Applicants respectfully requests that the Examiner reconsider the present application including rejected claims, as amended, and withdraw the claim rejections.

Request to Remove the Finality of this Action

In the Office Action dated December 4, 2003, the Examiner rejected claim 63 under 35 U.S.C. § 103(a) as being allegedly unpatentable over United States Patent No. 5,325,204 to Scarpa ("Scarpa") in view of United States Patent No. 6,185,418 to MacLellan et al. ("MacLellan"). However, in the current Office Action the Examiner withdrew this rejection and newly rejected claim 63 under 35 U.S.C. 103(a) as being allegedly unpatentable over United States Patent No. 5,872,540 to Casabona et al. ("Casabona") in view of MacLellan.

Claim 63 was not amended, and was rejected as originally filed. Thus, the Examiner has introduced a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c). As a result, this action cannot properly be made final. (See MPEP 706.07(a).)

In addition, Applicants observe that a new ground of rejection has also been provided for claim 64. And although claim 64 was amended in the previous response, this amendment involved a correction of a formal matter and cannot be considered as necessitating the new ground of rejection.

Applicants therefore respectfully request that the Examiner withdraw the final rejection as being premature.

Claim Rejections - 35 USC § 112

The Examiner has rejected claims 1, 5, 7-9, 29, 33, 35, 37, 58, 72 and 75 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, in each of these claims the Examiner alleges that the term "substantially is vague and indefinite because it fails to distinctly reference a definite boundary. Applicants respectfully traverse this rejection as it applies to all of claims 1, 5, 7-9, 29, 33, 35, 37, 58, 72 and 75.

The term "substantially," while broad is not indefinite. The fact that this claim language may not be precise does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph. In each case that the term "substantially" is used in these claims, one of ordinary skill in the art would understand what is claimed in light of Applicants' specification.

In fact, this term is acknowledged as being acceptable in MPEP 2173.05(b) and has been upheld as acceptable by the Court of Appeals for the Federal Circuit. (See, e.g., Verve, LLC v. Crane Cams, Inc., 311 F.3d 1116 (Fed. Cir. 2002). As a result, the use of the term "substantially" in these claims is not indefinite simply because it does not reference a distinct boundary.

Therefore, based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 1, 5, 7-9, 29, 33, 35, 37, 58, 72 and 75 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim Rejections – 35 USC § 102

Rejection based on Larrick

The Examiner has rejected claims 58 and 71 under 35 U.S.C. 102(a) as being allegedly anticipated by United States Patent No. 6,026,125 to Larrick, Jr. et al ("Larrick"). Applicants respectively traverse this rejection.

Claim 58 recites an RFI extraction mechanism in a radio end of a UWB receiver, comprising: means for inverting and time-shifting a first impulse component and a second impulse response component in the radio from end, each of the first impulse response component having a first impulsive shape and the second impulse response component having a second impulsive shape; and means for adjusting a relative position of the first impulse response component and second impulse response component so as to pass a UWB signal, but substantially cancel a narrowband interfering signal. Larrick does not disclose these features.

Larrick discloses a time gating circuit 120 that gates a continuous wave phase and/or frequency-controlled signal from an oscillator 106 in a tightly controlled manner. One embodiment of the time gating circuitry 120 includes two high speed switches S1 and S2, and a delay line 180. The delay line 180 is tapped at a first tap 180a to control the switch S1 and at a second tap 180b to control the switch S2. If a programmable delay device is used to form the delay line 180, the bandwidth of a generated UWB signal can be adjusted in a real-time basis by adjusting the delay. In addition, by using the oscillator 106, which can be hopped in frequency, the instantaneous bandwidth and center frequency of the radiated UWB signal can be changed on a pulse-to-pulse basis. (See, e.g., Larrick, column 9, lines 58-60, column 9, line 27, through column 10, line 27, and FIG. 4.)

However, none of this discloses inverting and time-shifting a first impulse component and a second impulse response component, or adjusting a relative position of the first impulse response component and second impulse response component so as to pass a UWB signal, but substantially cancel a narrowband interfering signal, as recited in claim 58. In particular, nothing in Larrick discloses inverting, time-shifting, or adjusting the relative position of impulse signals. Adjusting the frequency and bandwidth of a signal is not the same as inverting, time-shifting, or adjusting the relative position a signal, as recited in claim 58.

Similarly, claim 71 recites an adjustable RFI extraction mechanism, comprising: means for time-shifting a first impulse response component and a second impulse response component of a UWB radio front end, the first impulse response component having a shape of a first wavelet of a UWB signal and the second impulse response component having a shape of a second wavelet of a UWB signal to be received; and means for adaptively adjusting a relative position of the first impulse response component and the second impulse response component to pass the UWB signal, but cancel a narrowband interfering signal.

Nothing in Larrick discloses time-shifting a first impulse response component and a second impulse response component, or adaptively adjusting a relative position of the first impulse response component and the second impulse response component to pass a UWB signal, but cancel a narrowband interfering signal, as recited in claim 71. In particular, nothing in Larrick discloses time shifting signals or adaptively adjusting a relative position of impulse response components. Adjusting the frequency and bandwidth of a signal is not the same as time-shifting or adaptively adjusting the relative position a signal.

Furthermore, with respect to both claims 58 and 71, Larrick is directed to a *transmitter* not a *receiver*, and so it does not disclose anything regarding methods for extracting RFI from a

signal, which is done to a received signal, not a transmitted signal. Since the signals in Larrick are only just being generated for transmission, they should include no narrowband interfering signals.

Therefore, based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 58 and 71 as being allegedly anticipated by Larrick.

Rejection based on Hartmann

The Examiner has rejected claim 66 under 35 U.S.C. 102(b) as being allegedly anticipated by United States Patent No. 4,577,168 to Hartmann ("Hartmann"). Applicants continue to traverse this rejection for at least the same reasons given in the response dated April 5, 2004.

Applicant's claim 66 recites an "adjustable RFI extraction mechanism for passing a UWB signal while suppressing a narrowband interference signal that overlaps the UWB signal in frequency." This shows that the recited circuit operates on incoming signal energy that includes both a UWB signal and a narrowband signal.

Hartmann does not disclose a transmission line configured to convey an incoming signal that includes a UWB signal and a narrowband signal, as recited in claim 66. Hartmann describes a notch filter that is used in the UHF band, and relates to filtering of signals with bandwidths in the UHF band. (See, e.g., Hartmann, column 1, lines 63-69, column 6, lines 45-47, and FIGs. 5 to 8.)

Claim 66 also recites a second transmission line having a second impedance and configured to convey a portion of the incoming signal for a predetermined distance and reflect the portion of the incoming signal, and a receiving transmission line having a third impedance

configured to receive respective portions of the incoming signal from the first transmission line and a reflected portion of the incoming signal from the second transmission line so as to create an impulse response having a first component that has a shape of a wavelet portion of the UWB signal and a second component that is delayed in time and inverted in at least one of shape and phase relative to multiple cycles of the narrowband interference signal.

Hartmann discloses a transformer bridge circuit having a SAW impedance element 48 and a conventional impedance 50. The circuit is designed such that equal impedances are achieved at a desired notch frequency. Under that condition a balance occurs between the two paths and no signal is transmitted to the output load resistor. The transformer bridge circuit includes a phase reversal transformer 56, which causes the signal through one leg to be out of phase with the signal in the other leg at resonance. In this way the circuit passes a signal in all bands but the pass band defined by the notch. (See, e.g., Hartmann, column 8, line 65, through column 9, line 22, and FIG. 29.)

Nothing in Hartmann discloses a second transmission line having a second impedance and configured to convey a portion of the incoming signal for a predetermined distance and reflect the portion of the incoming signal, as recited in claim 66. Both the conventional impedance and the SAW impedance pass a signal, but do not reflect it.

Similarly, nothing in Hartmann discloses passing separate portions of the incoming signal. Each leg of the circuit of Fig. 29 passes the whole signal. It's just that the SAW impedance acts as a band pass filter and only passes the signal during a preset frequency band. Thus, Hartmann does not discloses or suggest a second transmission line "configured to convey a portion of the incoming signal," as recited in claim 66.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claim 66 under 35 U.S.C. 102(b) as being allegedly anticipated by Hartmann.

Claim Rejections – 35 USC § 103

Rejection based on Miller, Scarpa, and Phu

The Examiner has rejected claims 1-3, 29, 30 and 31 under 35 U.S.C. 103(a) as being allegedly unpatentable over Miller et al. ("Miller") (RFI Suppression for Ultra Wideband Radar), in view of Scarpa, and further in view of Phu et al. ("Phu") (An Ultra-Wideband Exciter for Ground-Penetration Radar Systems). Applicants respectfully traverse this rejection.

Claim 1 recites An RFI extraction mechanism for passing a UWB signal while suppressing a narrowband interference signal that overlaps the UWB signal in frequency, comprising: a network having an input terminal configured to receive an incoming signal that includes a UWB signal and the narrowband interference signal, an output terminal, and a circuit configured to have an impulse response having a first component that has a first impulsive shape, and at least one other component delayed in time from the first component, and having a second impulsive shape. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests this feature. The Examiner has cited Miller as showing these features. However, this is not the case.

The portion of Miller cited by the Examiner simply shows that a sampled signal may have a sampled wideband target return $s(t_n)$, a sampled noise portion $\eta(t_n)$, and an interference signal represented by L sinusoids. (See, e.g., Miller, page 1144, column 2, bottom half.) But there is no disclosure or suggestion of a circuit configured to have an impulse response having a first component that has a first impulsive shape, and at least one other component delayed in time from the first component and having a second impulsive shape.

In fact, the RFI extraction system disclosed in Miller exploits prior signal knowledge to extract interference, not a circuit having an impulse response. This can be seen in Fig. 5 of Miller, which shows the use of summers that variously subtract out an estimate of wideband targets, an estimate of FM interference, and an estimate of fixed interference from different part of an incoming signal.

Exemplary embodiments of the circuit configured to have an impulse response are shown in Applicants' FIGs. 4(d) and 4(e). In particular, FIG. 4(d) shows a circuit whose resulting impulse characteristic includes a first pulse that mimics that of a received pulse, and then an inverted pulse that is delayed in time. (See, e.g., Applicants' specification, page 31, lines 11-13.) Similarly, FIG. 4(e) shows a circuit whose resulting impulse characteristic is similar to that of FIG. 4(d), except that the delayed version of the incoming pulse is time shifted but is not inverted. (See, e.g., Applicants' specification, page 31, lines 15-17.)

Note that although Applicants' disclosed circuits are referred to as "notching" a signal, it isn't notching using a BPF. In a conventional spectral analysis, the bandpass characteristics of the RFI extraction mechanism would appear to have a "notch" centered at f_n, thus creating a discontinuity in the receive band as shown in Figure 7(c). However, because the wavelet-based UWB signals according to the present invention pass unscathed through the RFI extraction mechanism, the spectrum as seen by a time-confined output event, depicted in Figure 7(b) is undisturbed. (See, e.g., Applicants' specification, page 33, lines 11-23.)

Claim 1 further recites that first and second widths of the first and second impulsive shapes, respectively, are less than a reference width of a half cycle of a highest frequency of the UWB signal. The Examiner acknowledges that Miller and Scarpa do not disclose this feature, and relies upon Phu for this teaching. However, Phu does not disclose this feature.

The Examiner cites Table 1 of Phu as showing this feature. But a careful examination of this table will show that it does not. Phu's Table 1 discloses a number of frequency notches that its disclosed device uses for filtering. It does not disclose, nor does it suggest, widths of first and second impulse shapes. Nothing in Phu discloses or suggests impulse shapes, and so it cannot disclose parameters defining how impulse shapes should be formed. The fact that Phu uses numerous frequencies and bandwidths for notch filtering has no bearing on the widths of impulsive shapes and cannot be properly used to render obvious such a claim limitation.

Claims 2 and 3 depend variously from claim 1 and are allowable for at least the reasons given above for claim 1.

Claim 2 further recites that an amount of delay between the first component and the at least one second component is electrically adjustable. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that Scarpa discloses this feature. However, this is not the case. The portions of Scarpa cited by the Examiner show that a course acquisition filter 30 and a narrow tracking filter 32 can have their center frequencies adjusted to match the frequency of detected interference signals. But as discussed above, a notch filter is not the same as an impulse response circuit. And so the fact that Scarpa provides for bandwidth adjustment of notch filters provides no suggestion to adjust the amount of delay between first and second components in an impulse response of a circuit, as recited in claims 1 and 2.

Claim 3 further recites an amount of delay between the first component and the at least one second component is mechanically adjustable. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that Scarpa discloses this feature. However, this is not the case. The portions of Scarpa cited by the Examiner show that the coefficient values of the acquisition and tracking filters can be implemented in a weight element and not using multipliers. However, this provides no suggestion for mechanically adjusting anything. Furthermore, as noted above, changing the bandwidth of notch filters is not the same as adjusting the amount of delay between first and second components in an impulse response of a circuit, as recited in claims 1 and 2.

Claim 29 recites a radio front end includes a network having an input terminal configured to receive an incoming signal that includes a UWB signal and the narrowband interference signal, an output terminal, and a circuit configured to have an impulse response having a first component that has a first impulsive shape, and at least one other component delayed in time from the first component, and having a second impulsive shape. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests these features.

As noted above, the portion of Miller cited by the Examiner for this rejection simply shows that a sampled signal may have a sampled wideband target return $s(t_n)$, a sampled noise portion $\eta(t_n)$, and an interference signal represented by L sinusoids. (See, e.g., Miller, page 1144, column 2, bottom half.) There is no disclosure or suggestion of a circuit configured to have an impulse response having a first component that has a first impulsive shape, and at least one other component delayed in time from the first component and having a second impulsive shape.

In fact, the RFI extraction system disclosed in Miller exploits prior signal knowledge to extract interference, not a circuit having an impulse response. This can be seen in Fig. 5 of Miller, which shows the use of summers that variously subtract out an estimate of wideband

targets, an estimate of FM interference, and an estimate of fixed interference from different part of an incoming signal.

Claim 29 further recites that first and second widths of the first and second impulsive shapes, respectively, are less than a reference width of a half cycle of a highest frequency of the UWB signal. The Examiner acknowledges that Miller and Scarpa do not disclose this feature, and relies upon Phu for this teaching. However, Phu does not disclose this feature.

As noted above, Phu, in its Table 1, discloses a number of frequency notches that its disclosed device uses for filtering. It does not disclose, nor does it suggest, widths of first and second impulse shapes. Nothing in Phu discloses or suggests impulse shapes, and so it cannot disclose parameters defining how impulse shapes should be formed. The fact that Phu uses numerous frequencies and bandwidths for notch filtering has no bearing on the widths of impulsive shapes and cannot be properly used to render obvious such a claim limitation.

Claims 30 and 31 depend variously from claim 1 and are allowable for at least the reasons given above for claim 29.

Claim 30 further recites that an amount of delay between the first component and the at least one second component is electrically adjustable. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 2.

Claim 31 further recites that an amount of delay between the first component and the at least one second component is mechanically adjustable. Nothing in Miller, Scarpa, or Phu, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 3.

Furthermore, the Examiner has provided no motivation to combine the teachings of Scarpa with those of Miller. All that is provided in the rejection after a recitation of citations to portions of Scarpa and Miller is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Miller et al. to incorporate [the claim language] in order to improve reception the wideband communication signal by attenuating narrowband signal interference."

Similarly, the Examiner has provided no motivation to combine the teachings of Phu with those of Scarpa and Miller. All that is provided in the rejection after a recitation of citations to portions of Phu, Scarpa, and Miller is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify the inventions of Miller et al. to incorporate [the claim language] in order to transmit a linear frequency modulated waveform with large bandwidth for high-resolution imaging and low-start frequency for efficient propagation."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements. The language relating to Scarpa is just a quote from the Background of the Invention describing the general purpose of the invention. The language relating to Phu is simply a description from the conclusion of Phu describing the purpose of the disclosed system.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the

same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Scarpa and Phu employ an entirely different interference cancellation operation than Miller. Scarpa and Phu employ filters, while Miller employs real-time digital suppression of the interference. In addition, Miller and Phu relate to ultra wideband systems, while Scarpa relates to a wideband system. These differences in Miller, Phu, and Scarpa provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 1-3, 29, 30 and 31 under 35 U.S.C. 103(a) as being allegedly unpatentable over Miller, in view of Scarpa, and further in view of Phu.

Rejection based on Scarpa and Phu

The Examiner has rejected claims 59-62 under 35 U.S.C. 103(a) as being allegedly unpatentable over Scarpa, in view of Phu. Applicants respectfully traverse this rejection.

Claim 59 recites an RFI extraction mechanism for passing a UWB signal while suppressing a narrowband interference signal that coincides with the UWB signal in frequency. Claim 59 further recites that first and second widths of first and second impulse response components, respectively, are less than a reference width of a half cycle of a highest frequency of the UWB signal. This shows that the recited mechanism operates on incoming signal energy that includes both a UWB signal and a narrowband signal.

In contrast, Scarpa discloses a digital notch filter apparatus for removing narrowband interference signals from a *wideband* communications signal. (See, e.g., Scarpa, abstract, lines 1-3.) Therefore, Scarpa does not disclose or suggest an RFI extraction mechanism for passing a UWB signal while suppressing a narrowband interference signal or that impulse response components in an incoming signal have widths less than a reference width of a half cycle of a highest frequency of the UWB signal, as required by claim 59.

Claim 59 further recites a controller configured to controllably adjust a relative position of a first impulse response component and a second impulse response component of a radio front-end. This is shown by way of example in the controller 340 of Applicants Figure 8A. As described in the specification, the nature and content of the RFI may be sensed by way of a receiver 370 and a power sensor 380 may be fed to a controller 340, for controlling the relative position of the impulse response components (i.e., elements 231 and 232 of Figure 8B). The processor-based controller 340 is programmed to control the relative position and orientation of a first impulse response component 231 and a second impulse response component 232. (See, e.g.,

Applicants' specification, page 34, lines 11-22, and Figures 8A and 8B.) Nothing in Scarpa discloses or suggests this feature.

Scarpa achieves narrowband interference cancellation through the use of digital recursive notch filters. In particular, Scarpa discloses that the center frequencies of the passbands in these filters may be adjusted in unison. (See, e.g., Scarpa, Abstract and column 5, lines 3-26.) However, nothing in Scarpa discloses or suggests adjusting the relative position of first and second impulse response components, as recited in claim 59. Scarpa simply discloses how to adjust the portions of the incoming signal that will be blocked by the various filters that are used. This is not the same as adjusting impulse response components, nor can it render obvious such a feature.

Claim 59 also recites that the controller is configured to adjust an amplifier bias of an amplifier in the radio front-end. Nothing in Scarpa discloses or suggests this feature. Since Scarpa does not disclose the controller, it likewise doesn't disclose that the controller adjust an amplifier bias.

Claim 59 further recites a control receiver configured to detect at least one of a signal energy level and a signal to noise ratio of the narrowband interference signal and provide an indication to the controller regarding a characteristic feature of the narrowband interference signal. Nothing in Scarpa discloses or suggests this feature.

Scarpa does disclose that the ratio between the filter bandwidth is a flexible design parameter which is related to the lowest signal to noise ratio ("SNR") interference signal sought to be canceled (See, e.g., Scarpa, column 7, lines 11-14), and that the ratio between the bandwidth of the acquisition filter 30 and the tracking filter 32 may be altered to permit the cancellation of interference signals with even lower signal to noise ratios (See, e.g., Scarpa,

column 7, lines 59-68), this is not the same as detecting the signal to noise ratio a narrowband interference signal and providing an indication to a controller regarding a characteristic feature of the narrowband interference signal, as recited in claim 59.

Although Scarpa notes that the ratio of bandwidths can be altered, there is no teaching or suggestion that the SNR be monitored or that any information regarding the SNR be sent to a controller. The fact that the alteration of the bandwidth ratio incidentally permits the cancellation of interference signals with lower signal to noise ratios does not render obvious the limitation recited in claim 59.

Claim 59 also recites that first and second widths of the first and second impulse response components, respectively, are less than a reference width of a half cycle of a highest frequency of the UWB signal.

The Examiner acknowledges that this is not shown in Scarpa, but relies instead on Phu to show this feature. In particular, the Examiner relies upon Table 1 of Phu to show this feature. However this table and related description do not disclose or suggest this recited feature. Table 1 in Phu provides a suggested list of notch frequencies and bandwidths that were used to derive the filtered chirp and spectrum shown in Figure 5 of Phu. (See, e.g., Phu, page 1137, second column, first full paragraph.) In particular, Table 1 of Phu discloses the parameters for fifteen separate notch frequencies and bandwidths corresponding to a number of possible interfering signals.

But variation in the notch frequencies and bandwidths used to derive a filtered chirp and spectrum does not disclose or suggest setting the widths of first and second impulse response components. Phu does not suggest the use of impulse response components, much less setting the widths of such components in a particular manner.

In addition, nothing in Phu cures the deficiencies in Scarpa disclosed above.

Claims 60-62 all ultimately depend upon claim 59 and are allowable for at least the reasons given above for claim 59.

Claim 62 further recites that the controller further comprises another amplifier connected to the first amplifier by a switch, the controller being configured to adjust a position of the switch to assist in positioning the first impulse response component and the second impulse response component. This is shown, for example, by the amplifiers 310 and 320 and the switches 350 and 360 of Applicants' Figure 8A. Neither Scarpa nor Phu, alone or in combination disclose or suggest this feature.

The Examiner has asserted that this is shown by the fixed weight elements 106, 116 and the switch 130 in Scarpa. However, these elements do not perform as the Examiner asserts. In Scarpa the switch 130 has a first input coupled to the output of the coarse SIN/COS lookup table 126 and a second input coupled to the output of the narrow SIN/COS lookup table 128. The output of the switch 130 is coupled to a gain control input of each of the adjustable weight elements 42, 50, 52, 54, 72, 80, 82, 84 of the acquisition filter 30 and the tracking filter 32. Accordingly, the acquisition filter 30 and the tracking filter 32 are gang tuned via the switch 130 so that the center frequencies of the passband filters 31, 33 of both the acquisition filter 30 and tracking filter 32 are adjusted in unison. (See, e.g., Scarpa, column 9, lines 29-40, and FIGs. 3A and 3B.) The switch 130 does not directly influence the operation of the fixed weight elements 106, 116 at all. In particular the switch 130 does not serve to connect either of the fixed weight elements 106, 116 to another amplifier, as required by claim 62.

Furthermore, the Examiner has provided no motivation to combine the teachings of Phu with those of Scarpa. All that is provided in the rejection after a recitation of citations to portions of Scarpa and Phu is the blanket assertion that "it would have been obvious to one of ordinary

skill in the art to modify Scarpa to incorporate [the claim language] in order to transmit a linear-frequency modulated waveform with large bandwidth for high-resolution imaging and low-start frequency for efficient propagation."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but is simply a description from the conclusion of Phu describing the purpose of the disclosed system.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 59-62 under 35 U.S.C. 103(a) as being allegedly unpatentable over Scarpa, in view of Phu.

Rejection based on Miller, Scarpa, Phu, and Hartmann

The Examiner has rejected claims 4, 5-9, 11, 72-76 under 35 U.S.C. 103(a), as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in further view of Hartmann. Applicants respectfully traverse this rejection.

Claims 4, 5-9, 11, and 72-74 depend variously from claim 1 and are allowable for at least the reasons given above in claim 1. Claims 75 and 76 depend from claim 31 and are allowable for at least the reasons given above in claim 31. Nothing in Hartmann cures the deficiencies in Miller, Scarpa, and Phu discussed above.

Claim 4 further recites that the first transmission line has a predetermined characteristic impedance matched to a source impedance of a device that provides the incoming signal, and is configured to convey the incoming signal; that the second transmission line has a second characteristic impedance and is configured to convey a portion of the incoming signal from the first transmission line for a predetermined distance and reflect the portion of the incoming signal; and that the receiving transmission line has a third characteristic impedance matched to the terminating load and configured to receive respective portions of the incoming signal from the first transmission line and a reflected portion of the incoming signal from the second

transmission line, and having as an output the output terminal. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests these features.

Hartmann discloses in its Fig. 29 a transformer bridge circuit having a SAW impedance element 48 and a conventional impedance 50. The circuit is designed such that equal impedances are achieved at a desired notch frequency. Under that condition a balance occurs between the two paths and no signal is transmitted to the output load resistor. The transformer bridge circuit includes a phase reversal transformer 56, which causes the signal through one leg to be out of phase with the signal in the other leg at resonance. In this way the circuit passes a signal in all bands but the pass band defined by the notch.

However, nothing in Hartmann discloses or suggests passing separate portions of the incoming signal or reflecting any portion of the incoming signal. Each leg of the circuit of Fig. 29 passes the whole signal. It's just that the SAW impedance acts as a band pass filter and only passes the signal during a preset frequency band.

Furthermore, the circuit of Hartmann could not read on the recited first, second, and receiving transmission lines since each of these lines either passes or reflects all or a portion of the incoming signal. However the SAW circuits shown in Hartmann will not be functional as designed with an impulse signal, and cannot pass such signals.

Claim 5 further recites that the characteristic impedance of the second transmission line is substantially equal to a parallel combination of the characteristic impedance of the first transmission line and the characteristic impedance of the receiving transmission line. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The portions of Hartmann cited by the Examiner relate to the selection of the values for the resistors 80, 84, and 86 in FIG. 33. However, nothing in the choice of these resistor values

discloses or suggests anything relating to first, second, or receiving transmission lines, as recited in claim 5.

Claim 6 further recites that the second transmission line is connected to the first transmission line and the receiving transmission line at one end thereof and a node held at a predetermined potential at an opposite end. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The Examiner asserts that this is shown in FIGs. 29 and 30b of Hartmann. However, as noted above, the SAW elements in Hartmann will not function properly when used with impulse components. And so the elements in FIGs. 29 and 30b cannot read on the elements recited in claim 6 and cannot serve to disclose the particular placement of these elements recited in claim 6.

Claim 7 further recites that a reflection in the second transmission line is caused by the second transmission line appearing to the narrowband signal as a substantially open circuit. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature. In particular, nothing in Hartmann discloses or suggests the use of an open circuit for a reflection.

Claim 9 further recites that the first transmission line has a predetermined impedance of substantially 50 ohms, the receiving transmission line has a third impedance of substantially 50 ohms, and the second transmission line has a second impedance of substantially 25 ohms. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature. In particular, nothing in Hartmann discloses or suggests the impedance values recited in claim 9.

Claim 11 further recites that the network includes at least one section, including a two-way splitter having the input terminal as an input, a first output, and a second output, a delay

element having an input connected to the first output of the two-way splitter, and having an output, and a combiner having a first input connected to the output of the delay element, a second input connected to the second output of the two-way splitter, and the output terminal as an output. This is shown by way of example in Applicants' FIG. 8A. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that this is shown by FIGs. 29 and 30b of Hartmann. However, nothing in these drawings discloses or suggests all of the features recited in claim 11. In particular, nothing in these figures shows a network as recited in claim 1 having a two-way splitter as well as a combiner with a second input connected to a second output of the two-way splitter.

Claim 72 and 75 further recites that a length of at least one of the first transmission line and the receiving transmission line is substantially zero. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that this is shown by FIG. 31 in Hartmann. However, this does not show all of the elements recited in claim 72. FIG. 31 is a schematic representation of the equivalent circuit for a packaged, single-phase, unidirectional transducer 60 including parasitic effects. (See, e.g., Hartmann, column 9, lines 23-25.) Nothing in this drawing discloses or suggests the length of transmission lines. In fact, FIG. 31 is only an equivalent circuit and does not suggest the length of any element in the real world.

Claim 73 and 76 further recites that respective lengths of the first, second, and receiving transmission lines are independently adjustable in each of the at least one sections so as to allow narrowband signals at multiple frequencies to be suppressed without suppressing the UWB signal

by more than a predetermined amount. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The Examiner asserts that this feature is disclosed in Table 1 of Hartmann. However, Table 1 discloses the results of tests of several different designs of the single phase, unidirectional transducer device 60 in an effort to optimize the parameters. (See, e.g., Hartmann, column 10, lines 58-68.) The fact that different designs were tested to optimize the values used in a final design does not disclose or suggest that respective lengths of the first, second, and receiving transmission lines are independently adjustable, as recited in claim 73.

Claim 74 further recites that the circuit includes a plurality of sections, each of the sections configured to suppress energy at a different frequency. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature.

The Examiner asserts that this feature is shown in FIGs. 3A and 3B of Scarpa, presumably by the course acquisition filter 30 and the narrow tracking filter 32. However, the Examiner is also relying upon these two filters 30 and 32 as showing how the recited UWB signal is conveyed to the output terminal and energy from the narrowband interference signal is substantially blocked from being output through the output terminal. The Examiner cannot rely upon this circuit in Scarpa to perform both functions.

Furthermore, the Examiner has provided no motivation to combine the teachings of Miller, Scarpa Phu, and Hartmann. All that is provided in the rejection after a recitation of citations to portions of Miller, Scarpa Phu, and Hartmann are the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify the inventions of Miller et al. in combination with Scarpa in combination with Phu to incorporate [the claim language] in order to

have a notch filter with broader rejection characteristics wherein the balance condition in the notch can then be achieved over a broader bandwidth."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. This is of particular concern given the large number of references cited by the Examiner in this rejection. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but is simply a quote from the Background of the Invention describing the results when the invention of Hartmann is used in a bridge configuration.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Hartmann relates to a UHF system, Scarpa relates to a wide band system, and Miller and Phu relate to UWB systems. In addition, Hartmann employs SAW circuits that would not function properly with the types of signals employed by Miller and Phu. These differences in Miller, Phu, Scarpa, and Hartmann provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 4, 5-9, 11, 72-76 under 35 U.S.C. 103(a), as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in further view of Hartmann.

Rejection based on Miller, Scarpa, Phu, Hartman, and Peckham

The Examiner has rejected claim 10 under 35 U.S.C. 103(a) as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in combination with Hartmann, in further view of United States Patent No. 6,215,359 to Peckham et al. ("Peckham"). Applicants respectfully traverse this rejection.

Claim 10 recites a varactor connected across the second transmission line which adjusts the electrical length of the second transmission line so as to tune the delay and provide an electronically tunable notch operator at the primary frequency of the narrowband signal. This is shown by way of example in the voltage controllable capacitor 420, resistor 410, and controlling voltage source 400 of Applicants' Figure 10. (See, e.g., Applicants' specification, page 36, lines

16-23.) None of Miller, Scarpa, Phu, Hartmann, or Peckham, alone or in combination, disclose or suggest this feature.

The Examiner acknowledges that Miller, Scarpa, Phu, Hartmann do not disclose a varactor connected the second transmission line, as recited in claim 10. For this teaching she relies upon Peckham. However, Peckham does not provide such a teaching.

While Peckham does disclose a variable impedance interstage matching circuit interconnecting first and second amplifier stages (See, e.g., Peckham, Abstract), this does not disclose or suggest the precise makeup and function of the varactor recited in claim 10. And even if it did disclose a varactor, simply disclosing an element does not suggest every use of that element. Applicants do not suggest that varactors are new. However, they do submit that the use of a varactor in the combination recited in claim 10 is novel. It would be impermissible for the Examiner to blindly assert that a varactor be used in the manner recited without some teaching that it be done.

In particular, the varactor recited in claim 10 adjusts the electrical length of the second transmission line so as to tune the delay and provide an electronically tunable notch operator. Nothing in Peckham or any of the other cited documents discloses or suggests that a varactor be used in this particular placement to perform this particular function.

Furthermore, the Examiner has provided no motivation to combine the teachings of Miller, Scarpa Phu, Hartmann, and Peckham. All that is provided in the rejection after a recitation of citations to portions of Miller, Scarpa Phu, Hartmann, and Peckham are the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify the inventions of Miller et al. in combination with Scarpa in combination with Phu et al. in combination with Hartmann to incorporate [the claim language] in order to efficiently amplify

and transmit signals at more than one frequency band while suppressing first, second, and higher order harmonics."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. This is of particular concern given the large number of references cited by the Examiner in this rejection. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but is simply a quote from the detailed description in Peckham describing the operation of the disclosed circuit.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Hartmann relates to a UHF system, Scarpa relates to a wide band system, Miller and Phu relate to UWB systems, and Peckham relates to a radiotelephone system. In addition, Hartmann employs SAW circuits that would not function properly with the types of signals employed by Miller, Phu, and Scarpa. These differences in Miller, Phu, Scarpa, Hartmann, and Peckham provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejections of claim 10 under 35 U.S.C. 103(a), as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in combination with Hartmann, in further view of Peckham.

Rejection based on Miller, Scarpa, Phu, Hartmann, and Weissman

The Examiner has rejected claims 12, 14, 15, 22, 23-28, 32-40 and 77 under 35 U.S.C. 103(a) as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in combination with Hartmann, in further view of United States Patent No. 6,501,942 to Weissman et al. ("Weissman"). Applicants respectfully traverse this rejection.

Claims 12, 14, 15, and 22-28 depend variously from claim 11 and are allowable for at least the reasons given above for claim 11.

Claim 12 further recites that the delay element comprises a plurality of amplifiers, at least one of the plurality of amplifiers having a bias adjustable delay and a delay bias input connected

in series. This is shown by way of example in Applicants' Figure 8A. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner acknowledges that Miller, Scarpa, Phu, and Hartmann do not disclose that a delay element comprise at least one of a plurality of amplifiers having a bias adjustable delay and a delay bias input connected in series. For this teaching the Examiner relies upon Weissman. In particular, she cites the power amplifier 128, the variable-gain amplifier 130, and the delay 137. However neither these elements nor any other portion of Weissman disclose or suggest the delay element recited in claim 12.

The delay 137 in Weissman is noted to be preferably a surface acoustic wave delay. This delay can be set on installation or set by a remote control modem. (See, e.g., Weissman, column 12, lines 28-33.) But the power amplifier 128 and the variable-gain amplifier 130 are shown to have very different functions. The output of amplifier 128 is sampled by an automatic gain control (AGC) circuit and is used to adjust the gain of variable-gain amplifier 130, so that the level of the amplified IF-REV signal is maintained at a level consistent with the link budget. (See, e.g., Weissman, column 12, lines 44-48.)

The mere fact that Weissman discloses a power amplifier 128, a variable-gain amplifier 130, and a delay 137 in series does not suggest that a delay element comprise a plurality of amplifiers, as recited in claim 12. In fact, the only actual delay suggested by this portion of Weissman is a surface acoustic wave delay (i.e., delay 137).

Claim 14 and claim 15 further define the isolation device. Due to a clerical error these two claims have been written to depend from claim 12, rather than claim 13, which initially recites the isolation device. Therefore, by this response, Applicants propose to amend claims 14

and 15 to depend from claim 13. Because claim 13 was indicated to be allowable, this would place claims 14 and 15 in condition for allowance as well.

Claim 22 recites that the delay element includes a transmission line. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner asserts that the delay element 137 in Weissman suggests this feature. However, Weissman discloses that the delay 137 is preferably a surface acoustic wave delay that can be set on installation or set by a remote control modem. (See, e.g., Weissman, column 12, lines 28-33.) There is no suggestion that the delay include a transmission line, as recited in claim 22.

Claim 25 recites at least one of the shunt C elements is electrically adjustable. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner asserts that this feature is disclosed in Table 1 of Hartmann. However, Table 1 discloses the results of tests of several different designs of the single phase, unidirectional transducer device 60 in an effort to optimize the parameters. (See, e.g., Hartmann, column 10, lines 58-68.) The fact that different designs were tested to optimize the values used in a final design does not disclose or suggest that a shunt C element be electrically adjustable, as recited in claim 25.

Claim 26 recites that at least one of the shunt C elements is a varactor. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner asserts that it is "well known in the art that a shunt C element can be modeled as a varactor." However, the Examiner has offered no documentation to support this assertion. Since this rejection appears to be based on facts within the personal knowledge of the

Examiner, Applicant respectfully calls upon the Examiner under the provisions of 37 CFR 1.104(d)(2) to support this assertion by affidavit. Such an affidavit will allow the Applicant an opportunity to offer comments contradicting or explaining the affidavit. This is of particular concern to the Applicant given the large number of references already relied upon for this rejection.

Claim 27 recites a monitoring mechanism configured to monitor at least one of a composite output level; and a controller configured to adjust the amount of delay and determine a predetermined delay that results in the composite output level being a minimum. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that Scarpa discloses this feature. However, this is not the case. The portions of Scarpa cited by the Examiner show that an interference detector monitors the output of the tracking filter and controls a notch filter circuit to switch from acquisition mode to tracking mode upon the detection of a narrowband interference signal within the passband of the tracking filter. (See, e.g., Scarpa, column 2, lines 55-59.) During the interference acquisition mode an acquisition mode center frequency control circuit adjusts the center frequency of the passband tracking filter to scan through the series of frequencies from which the notch filter circuit is designed to eliminate narrowband interference. (See, e.g., Scarpa, column 2, lines 55-59.) However, adjusting the center frequency of a filter does not disclose or suggest adjusting the amount of delay, as recited in claim 27.

Claim 28 recites that the controller is configured to adjust the amount of delay across a range of delay that corresponds with a bandwidth that contains the UWB signal. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner has asserted that Scarpa discloses this feature. However, this is not the case. The portions of Scarpa cited by the Examiner show that filters 30, 32 have their center frequencies adjusted to match the frequency of detected interference signals. (See, e.g., Scarpa, column 5, lines 22-26.) However, adjusting the center frequency of a filter does not disclose or suggest adjusting the amount of delay, as recited in claim 28.

Claim 32 depends from claim 31 and is allowable for at least the reasons given above for claim 31. In addition, claim 32 recites that the output terminal of the network is connected to a terminating load of a predetermined impedance; that the circuit comprise at least one section, connected in series through at least one of an isolation device, a circulator, and an amplifier; and that the at least one section include: a first transmission line having a predetermined characteristic impedance matched to a source impedance of a device that provides the incoming signal, and configured to convey the incoming signal; a second transmission line having a second characteristic impedance and configured to convey a portion of the incoming signal from the first transmission line for a predetermined distance and reflect the portion of the incoming signal; and a receiving transmission line having a third characteristic impedance matched to the terminating load and configured to receive respective portions of the incoming signal from the first transmission line and a reflected portion of the incoming signal from the second transmission line, and having as an output the output terminal. Nothing in Miller, Scarpa, Phu, or Hartmann,

alone or in combination, discloses or suggests these features for reasons analogous to those given above for claim 4. Weissman does not cure the deficiencies in these documents.

Claim 33 depends from claim 32 and is allowable for at least the reasons given above for claim 32. In addition, claim 33 recites that the characteristic impedance of the second transmission line is substantially equal to a parallel combination of the characteristic impedance of the first transmission line and the characteristic impedance of the receiving transmission line. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 5. Weissman does not cure the deficiencies in these documents.

Claim 34 depends from claim 33 and is allowable for at least the reasons given above for claim 33. In addition, claim 34 recites that the second transmission line is connected to the first transmission line and the receiving transmission line at one end thereof and a node held at a predetermined potential at an opposite end. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 6. Weissman does not cure the deficiencies in these documents.

Claim 35 depends from claim 34 and is allowable for at least the reasons given above for claim 34. In addition, claim 35 recites that an electrical length of the second transmission line is substantially at least one of a quarter wavelength and any number of multiples of 1/2 wavelength of a primary frequency of the narrowband signal, and that a reflection in the second transmission line is caused by the second transmission line appearing to the narrowband signal as a substantially open circuit. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 7. Weissman does not cure the deficiencies in these documents.

Claim 36 depends from claim 35 and is allowable for at least the reasons given above for claim 35.

Claim 37 depends from claim 36 and is allowable for at least the reasons given above for claim 36. In addition, claim 37 recites that the first transmission line has a predetermined impedance of substantially 50 ohms, the receiving transmission line has a third impedance of substantially 50 ohms, and the second transmission line has a second impedance of substantially 25 ohms. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 9. Weissman does not cure the deficiencies in these documents.

Claim 38 depends from claim 37 and is allowable for at least the reasons given above for claim 37. In addition, claim 38 recites a varactor connected across the second transmission line which adjusts the electrical length of the second transmission line so as to tune the delay and provide an electronically tunable notch operator at the primary frequency of the narrowband signal. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 10. In fact, the Examiner concedes in her rejection of claim 10 that Miller in combination with Scarpa in combination with Phu in combination with Hartmann does not disclose a varactor connected across the second transmission line. Weissman does not cure the deficiencies in these documents.

Claim 39 depends from claim 38 and is allowable for at least the reasons given above for claim 38. In addition, claim 39 recites that the output terminal of the network is connected to a terminating load of a predetermined impedance; that the network include at least one section, connected in series, and that each section include a two-way splitter having the input terminal an input, a first output, and a second output, a delay element having an input connected to the first

output of the two-way splitter, and having an output, and a combiner having a first input connected to the output of the delay element, a second input connected to the second output of the two-way splitter, and the output terminal as an output. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 11. Weissman does not cure the deficiencies in these documents.

Claim 40 depends from claim 39 and is allowable for at least the reasons given above for claim 39. In addition, claim 40 recites a plurality of amplifiers, at least one of the plurality of amplifiers having a bias adjustable delay and a delay bias input connected in series. Nothing in Miller, Scarpa, Phu, or Hartmann, alone or in combination, discloses or suggests this feature for reasons analogous to those given above for claim 12.

Claim 77 recites that a circuit including a plurality of sections, each of the sections configured to suppress energy at a different frequency. Nothing in Miller, Scarpa, Phu, Hartmann, or Weissman, alone or in combination, discloses or suggests this feature.

The Examiner asserts that this feature is shown in FIGs. 3A and 3B of Scarpa, presumably by the course acquisition filter 30 and the narrow tracking filter 32. However, the Examiner is also relying upon these two filters 30 and 32 as showing how the recited UWB signal is conveyed to the output terminal and energy from the narrowband interference signal is substantially blocked from being output through the output terminal. The Examiner cannot rely upon this circuit in Scarpa to perform both functions.

Furthermore, the Examiner has provided no motivation to combine the teachings of Miller, Scarpa Phu, Hartmann, and Weissman. All that is provided in the rejection after a recitation of citations to portions of Miller, Scarpa Phu, Hartmann, and Weissman are the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify the

inventions of Miller et al. in combination with Scarpa in combination with Phu et al. in combination with Hartmann to incorporate [the claim language] so that the level of the amplified signal is maintained at a level consistent with the link budget."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. This is of particular concern given the large number of references cited by the Examiner in this rejection. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but is simply a quote from the disclosure observing an advantage of the disclosed circuit.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Hartmann relates to a UHF system, Scarpa relates to a wide band system, Miller and Phu relate to UWB systems, and Peckham relates to an RF system. In addition, Hartmann employs SAW circuits that would not function properly with the types of signals employed by Miller and Phu. These differences in Miller, Phu, Scarpa, Hartmann, and Peckham provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 12, 14, 15, 22, 23-28, 32-40 and 77 under 35 U.S.C. 103(a) as being allegedly unpatentable over Miller, in combination with Scarpa, in combination with Phu, in combination with Hartmann, in further view of Weissman.

Rejection based on Hartmann and MacLellan

The Examiner has rejected claim 57 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of MacLellan. Applicants respectfully traverse this rejection.

Claim 57 recites an RFI extraction mechanism including a first transmission line having a predetermined impedance and configured to convey an incoming signal that includes a UWB signal. Nothing in Hartmann or MacLellan, alone or in combination discloses or suggests this feature.

The Examiner relies upon Hartmann for a teaching of this feature, but the cited portions of Hartmann do not properly disclose or suggest it. In fact, Hartmann does not disclose a circuit that could pass a UWB signal. As Hartmann notes, for frequencies above approximately 150 MHz, notch circuits are generally not used because of problems with temperature drift and poor Q. (See, e.g., Hartmann, column 6, lines 19-41.) For this reason, Hartmann suggests that it is desirable to implement notch filters using SAW devices particularly in the UHF band. (See, e.g., Hartmann, column 6, lines 42-47.) Hartmann then goes on to note that such notch filters have acceptable insertion loss, reasonable width and depth of the notch itself, and flat amplitude response characteristics from 50 to 500 MHz. (See, e.g., Hartmann, column 9, lines 54-57.) But there is no indication that this circuit would be functional at the higher frequencies required for a UWB signal. Thus, Hartmann does not disclose first transmission line configured to convey an incoming signal that includes a UWB signal and a narrowband signal.

Claim 57 also recites a receiving transmission line configured to receive respective portions of an incoming signal from a first transmission line and a reflected portion of the incoming signal from a stub so as to create an impulse response having a first component that has a shape of a wavelet portion of a UWB signal and a second component that is delayed in time and inverted in shape from the wavelet portion. Nothing in Hartmann or MacLellan, alone or in combination discloses or suggests this feature.

Again the Examiner relies upon Hartmann for a teaching of this feature, and again the cited portions of Hartmann do not properly disclose or suggest it. Just as Hartmann does not disclose a first transmission line that can pass a UWB signal, it likewise does not disclose a third transmission line configured to create an impulse response having a first component that has a shape of a wavelet portion of a UWB signal and a second component that is delayed in time and inverted in shape from the wavelet portion. Nothing in Hartmann discloses or suggests that any of its circuits be used to manipulate wavelet portions of a UWB signal, nor does it even indicate whether such manipulation is possible in the disclosed circuitry at UWB frequencies.

MacLellan does not cure the deficiencies in Hartmann disclosed above.

Furthermore, the Examiner has provided no motivation to combine the teachings of MacLellan and Hartman. All that is provided in the rejection after a recitation of citations to portions of MacLellan and Hartman is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Hartmann to incorporate [the claim language] to more efficiently use the available bandwidth of a time-varying RF channel and/or to provide a flexible and adaptive digital communication system."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but simply shows a description of the advantages of the disclosure in MacLellan from its abstract.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claim 57 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of MacLellan.

Rejection based on Casabona and MacLellan

The Examiner has rejected claim 63 under 35 U.S.C. 103(a) as being allegedly unpatentable over Casabona, in view of MacLellan. Applicants respectfully traverse this rejection.

Claim 63 recites an RFI extraction mechanism including a controller configured to controllably adjust a relative position of a first component and a second component of an impulse

response function of a radio front-end, the controller being configured to adjust an amplifier bias of an amplifier in the radio front-end, a control receiver configured to detect a signal energy level and a signal to noise ratio of a UWB signal, and a sensor configured to detect an output power of the UWB signal. Nothing in Casabona or MacLellan, alone or in combination, discloses or suggests this feature.

In particular, MacLellan relates to an RF circuit (See, e.g., MacLellan, abstract), while Casabona relates to a GPS system (See, e.g., Casabona, abstract). Nothing in either document discloses or suggests a UWB signal.

Claim 63 also recites a bi-phase wavelet demodulator configured to detect data from a signal output from the RFI extraction mechanism. The Examiner acknowledges that Casabona does not disclose this feature, but instead relies on MacLellan for a teaching of this element. However, the cited portions of MacLellan do not disclose or suggest a bi-phase wavelet demodulator as recited in claim 63.

As noted by the Examiner, MacLellan discloses a digital demodulator 106 in a conventional digital radio. It notes that in radio frequency (RF) digital radio systems, a terminal unit communicates with other terminal units using modulated radio signals. The terminal units include digital receivers which demodulate the incoming digitally modulated RF carrier to reproduce the data message being transmitted. (See, e.g., MacLellan, column 1, lines 11-19.) But Claim 63 recites more than just a signal demodulator. It recites a bi-phase wavelet demodulator. Bi-phase wavelets and demodulation of such wavelet are described in Applicants' specification. Nothing in MacLellan discloses or suggests the use of a bi-phase wavelet demodulator. The fact that MacLellan discloses a "digital demodulator" 106 does not provide sufficient detail to show the recited bi-phase wavelet demodulator.

Furthermore, the Examiner has provided no motivation to combine the teachings of Casabona and MacLellan. All that is provided in the rejection after a recitation of citations to portions of Casabona and MacLellan is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Casabona et al. to incorporate [the claim language] to more efficiently use the available bandwidth of a time-varying RF channel and/or to provide a flexible and adaptive digital communication system."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but simply shows a description of the advantages of the disclosure in MacLellan from its abstract.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Casabona relates to a GPS system while MacLellan relates to an RF system. These differences in Casabona and MacLellan provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

By this response Applicants have amended claim 63 to correct a problem of antecedent basis. In particular, the first occurrence of the term "said UWB signal" has been amended to read "a UWB signal."

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claim 63 under 35 U.S.C. 103(a) as being allegedly unpatentable over Casabona in view of MacLellan.

Rejection based on Larrick and Richards

The Examiner has rejected claim 64 under 35 U.S.C. 103(a) as being allegedly unpatentable over Larrick, in view of United States Patent No. 6,304,623 to Richards et al. ("Richards"). Applicants respectfully traverse this rejection.

Claim 64 recites a method for controlling a relative position of a first impulse response component and a second impulse response component of a radio-front end in a UWB receiver, including receiving at a radio-front end a UWB signal corrupted with narrowband interference at a predetermined frequency; and determining a relative position of a first impulse response

component and a second impulse response component to cancel the narrowband interference. The Examiner asserts that these features are shown in Larrick, but this is not the case.

Larrick discloses a transmitter circuit in which a combination of phase, frequency, and amplitude modulations enable the generation of a wide class of UWB waveforms. (See, e.g., Larrick, column 6, lines 47-54.) In particular, Larrick discloses a time gating circuit 120 that gates a continuous wave phase and/or frequency-controlled signal from an oscillator 106 in a tightly controlled manner. One embodiment of the time gating circuitry 120 includes two high speed switches S1 and S2, and a delay line 180. The delay line 180 is tapped at a first tap 180a to control the switch S1 and at a second tap 180b to control the switch S2. If a programmable delay device is used to form the delay line 180, the bandwidth of a generated UWB signal can be adjusted in a real-time basis by adjusting the delay. In addition, by using the oscillator 106, which can be hopped in frequency, the instantaneous bandwidth and center frequency of the radiated UWB signal can be changed on a pulse-to-pulse basis. (See, e.g., Larrick, column 9, lines 58-60, column 9, line 27, through column 10, line 27, and FIG. 4.)

However, none of this discloses or suggests receiving at a radio-front end a UWB signal corrupted with narrowband interference at a predetermined frequency, or determining a relative position of a received first impulse response component and a second impulse response component to cancel the narrowband interference, as recited in claim 64. In fact, Larrick is directed to a *transmitter* not a *receiver*, and so it does not disclose anything regarding methods for use in a UWB receiver. Adjusting the frequency and bandwidth of a transmitted signal is not the same as determining a relative position of a first impulse response component and a second impulse response component to cancel the narrowband interference. In fact, since Larrick is only just generating a UWB signal, there should be no narrowband interference. Furthermore, Larrick

discloses nothing regarding the determination of relative positions of impulse response components.

Claim 64 also recites determining an amplifier bias of an amplifier in the radio front end to achieve the relative position; accessing a memory table containing a target value for the amplifier bias corresponding to the predetermined frequency; and sending the target value to the amplifier. The Examiner acknowledges that Larrick does not disclose these feature. For this teaching she relies upon Richards. However, Richards does not disclose or suggest these recited steps.

In particular, the Examiner has cited FIGs. 4 and 13 of Richards as showing these features. But these assertions are not proper. However FIG. 4 illustrates a block diagram of a precision timing generator, while FIG. 13 shows a fine timing generator. Neither of these circuits disclose or suggest anything relating to determining amplifier biases.

In the circuit of Richard's FIG. 4, a system clock signal 416 and a timing command input 420 drive the coarse and fine timing generators. The fine timing generator 408 generates a fine timing signal 429 that subdivides a coarse timing interval into smaller intervals or a continuously variable interval. The fine timing generator 408 operates in response to a timing command input 420, and generally produces several time transitions resulting in ambiguity at the coarse time interval. The timing command input 420 is a data word specifying a desired delay value, as will be discussed at length below. A combiner circuit 412 then selects a fine timing signal 429 and a coarse timing signal 428 to produce a precision timing output 436. (See, e.g., Richards, column 7, lines 40-64, and FIG. 4.)

Similarly, in the circuit of Richard's FIG. 13, a fine time generator is an I/Q modulator used for a precision delay or a phase shift. This I/Q phase shift circuit implements the standard

trigonometric relationship for angle addition: sin(A+B)=sin A cos B+cos A sin B, where, A represents the time dependency of the phase shifted signals 1344 and 1348, and the angle B is the desired phase shift angle. (See, e.g., Richards, column 15, line 60, through column 8, line 24, and FIG. 13.)

However, neither of these circuits determine amplifier biases or send target biases to an amplifier. A timing signal is not the same as an amplifier bias, and methods and circuits for generating a timing signal do not disclose or suggest how an amplifier bias should be determined or sent. Furthermore, the simple fact that Richards may use a table to contain sine and cosine values does not render obvious accessing a memory table containing target values for an amplifier bias, as recited in claim 64. The Examiner must show some teaching in Richards to suggest that amplifier bias values be stored in a memory, and no such teaching has been provided.

Furthermore, the Examiner has provided no motivation to combine the teachings of Larrick and Richards. All that is provided in the rejection after a recitation of citations to portions of Larrick and Richards is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Larrick, Jr. et al. to incorporate [the claim language] in order to a timing generator that provides highly accurate, stable, low jitter, and agile timing signals in response to a rapidly changing timing command output."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what

the combination would achieve does not provide a proper motivation to combine the elements, but is simply a quote from the Summary of the Invention in Richards describing the disclosed invention.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claim 64 under 35 U.S.C. 103(a) as being allegedly unpatentable over Larrick, in view of Richards. Applicants respectfully traverse this rejection.

Rejection based on Larrick, Richards, and Ross

The Examiner has rejected claim 65 under 35 U.S.C. 103(a) as being unpatentable over Larrick, in combination with Richards, in further view of United States Patent No. 5,337,054 to Ross et al. ("Ross"). Applicants respectfully traverse this rejection.

Claim 65 depends from claim 64 and is allowable for at least the reasons given above for claim 64. Ross does not cure the deficiencies in Larrick and Richards discussed above.

In addition, claim 65 recites that the method further comprises tracking changes in the predetermined frequency; and adjusting the target value sent to the amplifier. The Examiner acknowledges that Larrick and Richards to not disclose these features. For this teaching she relies upon Ross. However, nothing in Ross shows these features.

Ross discloses a UWB receiver having a tunnel diode envelope generator 23 and a CFAR receiver 18. (See, e.g., Ross, column 5, lines 1-3.) However, nothing in this circuit discloses or suggests tracking a predetermined frequency of a narrowband interference. In fact, nothing in Ross discloses anything related to a narrowband interference signal.

In addition, nothing in this circuit discloses or suggests adjusting a target value corresponding to that frequency that is sent to an amplifier. The mere fact that Ross may send a bias value to an amplifier does not render obvious the feature of adjusting the target value sent to the amplifier. Ross must disclose or suggest adjusting a target value corresponding to a predetermined frequency that was accessed from a memory table and subsequently sent to an amplifier, which Ross does not do.

Furthermore, the Examiner has provided no motivation to combine the teachings of Larrick, Richards, and Ross. All that is provided in the rejection after a recitation of citations to portions of Larrick, Richards, and Ross is the blanket assertion that "it would have been obvious

to one of ordinary skill in the art to modify Larrick, Jr. et al. in combination with Richards et al. to incorporate [the claim language] in order to detect pulse packets of very short duration microwave energy an establish the proper noise figure and receiver sensitivity levels."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but simply reflects a pair of quotes from Ross indicating a prior art problem and a description of part of the disclosed invention.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged

in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

In particular, Applicants observe that Larrick relates to a transmitter while Ross relates to a receiver, and Richards relates to a timing generator. These differences in Larrick, Ross, and Richards provide further evidence that it would not have been obvious at the time of the invention for a person of ordinary skill in the art to combine elements of these very different disclosures.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claim 65 under 35 U.S.C. 103(a) as being allegedly unpatentable over Larrick, in combination with Richards, in further view of Ross.

Rejection based on Hartmann and Peckham

The Examiner has rejected claims 67-69 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of Peckham. Applicants respectfully traverse this rejection.

Claims 67-69 depend from claim 66 and are allowable for at least the reasons given above for claim 66. Nothing in Peckham cures the deficiencies in Hartmann discussed above.

In addition, claim 67 recites that the second transmission line includes a variable capacitor and a voltage source configured to apply voltage to the capacitor. The Examiner acknowledges that Hartmann does not disclose this feature. For this teaching she relies upon Peckham. However, nothing in Peckham shows this feature.

While Peckham does disclose a variable impedance interstage matching circuit interconnecting first and second amplifier stages (See, e.g., Peckham, Abstract), this does not disclose or suggest the use of a variable capacitor and voltage source, as recited in claim 67. The

passage cited by the Examiner relates to the situation when a 2.7 V positive voltage source is applied to node 465, diodes 415, 425, 435, 445 turn on, and the approximately 3 pF capacitances 422, 442, 452, 482 and the inherent inductance in the diodes 415, 425, 435, 445 filter out 1800 MHz signals. (See, e.g., Peckham, column 5, lines 24-34.) However, diodes that can be turned on and off are not the same as a variable capacitor, and cannot be used to render obvious such an element.

Claim 67 specifically recites that the second transmission line (which is configured to convey a portion of an incoming signal for a predetermined distance and reflect a portion of the incoming signal) include a variable capacitor and a voltage source configured to apply voltage to the capacitor. As Applicants note with respect to their FIG. 10, this provides a certain advantage in that it allows the amount of delay imparted by the second transmission line to be controllable. Nothing in Peckham discloses or suggests using a variable capacitor and voltage source in place of a transmission line in this particular circumstance.

Claim 68 depends from claim 67 and is allowable for at least the reasons given above for claim 67. In addition, claim 68 recites the voltage source applies a manually adjustable voltage to the capacitor. The Examiner acknowledges that Hartmann does not disclose this feature. For this teaching she relies upon Peckham. However, nothing in Peckham shows this feature.

As noted above, Peckham discloses that when a 2.7 V positive voltage source is applied to node 465, diodes 415, 425, 435, 445 turn on, and the approximately 3 pF capacitances 422, 442, 452, 482 and the inherent inductance in the diodes 415, 425, 435, 445 filter out 1800 MHz signals. (See, e.g., Peckham, column 5, lines 24-34.) However, nothing in this description discloses or suggests that a voltage applied by voltage source to a variable capacitor be manually adjustable, as recited in claim 68.

Claim 69 depends from claim 67 and is allowable for at least the reasons given above for claim 67. In addition, claim 69 recites that the voltage source applies a voltage to the capacitor regulated by a voltage controller. The Examiner acknowledges that Hartmann does not disclose this feature. For this teaching she relies upon Peckham. However, nothing in Peckham shows this feature.

As noted above, Peckham discloses that when a 2.7 V positive voltage source is applied to node 465, diodes 415, 425, 435, 445 turn on, and the approximately 3 pF capacitances 422, 442, 452, 482 and the inherent inductance in the diodes 415, 425, 435, 445 filter out 1800 MHz signals. (See, e.g., Peckham, column 5, lines 24-34.) However, nothing in this description discloses or suggests that a voltage applied by a voltage source to a variable capacitor is regulated by a voltage controller, as recited in claim 69.

Furthermore, the Examiner has provided no motivation to combine the teachings of Hartmann and Peckham. All that is provided in the rejection after a recitation of citations to portions of Hartmann and Peckham is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Hartmann to incorporate [the claim language] to in order to turn on the diodes and filter out unwanted signals and to control the operation of the matching circuit."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements,

but simply provides a circular justification by asserting that it would be obvious to include the elements of Peckham so that the elements of Peckham could be used.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 67-69 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of Peckham. Applicants respectfully traverse this rejection.

Rejection based on Hartmann and MacLellan

The Examiner has rejected claim 70 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of MacLellan. Applicants respectfully traverse this rejection.

Applicants' claim 70 recites an adjustable RFI extraction mechanism including a first transmission line having a predetermined impedance and configured to convey an incoming signal that includes a UWB signal and a narrowband signal. This shows that the recited circuit operates on an incoming signal energy that includes both a UWB signal and a narrowband signal. Neither Hartmann nor MacLellan, alone or in combination, disclose or suggest this feature, for reasons analogous to those given above for claim 58.

Hartmann describes a notch filter that is used in the UHF band, and relates to filtering of signals with bandwidths in the UHF band. (See, e.g., Hartmann, column 1, lines 63-69, column 6, lines 45-47, and FIGs. 5 to 8.) A UHF device does not disclose, nor can it suggest, a UWB system.

Claim 70 also recites a second transmission line having a second impedance and configured to convey a portion of the incoming signal for a predetermined distance and reflect the portion of the incoming signal, and a receiving transmission line having a third impedance configured to receive respective portions of the incoming signal from the first transmission line and a reflected portion of the incoming signal from the second transmission line so as to create an impulse response having a first component that has a shape of a wavelet portion of the UWB signal and a second component that is delayed in time and inverted in shape from the wavelet. Neither Hartmann nor MacLellan, alone or in combination, disclose or suggest this feature.

Hartmann discloses a transformer bridge circuit having a SAW impedance element 48 and a conventional impedance 50. The circuit is designed such that equal impedances are achieved at a desired notch frequency. Under that condition a balance occurs between the two paths and no signal is transmitted to the output load resistor. The transformer bridge circuit includes a phase reversal transformer 56, which causes the signal through one leg to be out of

phase with the signal in the other leg at resonance. In this way the circuit passes a signal in all bands but the pass band defined by the notch. (See, e.g., Hartmann, column 8, line 65, through column 9, line 22, and FIG. 29.)

Nothing in Hartmann discloses or suggests a second transmission line having a second impedance and configured to convey a portion of the incoming signal for a predetermined distance and reflect the portion of the incoming signal, as recited in claim 70. Both the conventional impedance and the SAW impedance pass a signal, but do not reflect it.

Similarly, nothing in Hartmann discloses or suggests passing separate portions of the incoming signal. Each leg of the circuit of Fig. 29 passes the whole signal. It's just that the SAW impedance acts as a band pass filter and only passes the signal during a preset frequency band. Thus, Hartmann does not discloses or suggest a second transmission line configured to convey a portion of the incoming signal, as recited in claim 70.

MacLellan does not cure the deficiencies in Hartmann noted above.

Claim 70 further recites a bi-phase wavelet demodulator configured to detect data from a signal output from the RFI extraction mechanism. The Examiner acknowledges that Hartmann does not disclose this feature. For this teaching she relies upon MacLellan. However, nothing in MacLellan shows this feature.

As noted by the Examiner, MacLellan discloses a digital demodulator 106 in a conventional digital radio. It notes that in radio frequency (RF) digital radio systems, a terminal unit communicates with other terminal units using modulated radio signals. The terminal units include digital receivers which demodulate the incoming digitally modulated RF carrier to reproduce the data message being transmitted. (See, e.g., MacLellan, column 1, lines 11-19.) But Claim 70 recites more than just a signal demodulator. It recites a bi-phase wavelet demodulator.

Bi-phase wavelets and demodulation of such wavelet are described in Applicants' specification. Nothing in MacLellan discloses or suggests the use of a bi-phase wavelet demodulator. The fact that MacLellan discloses a "digital demodulator" 106 does not provide sufficient detail to show the recited bi-phase wavelet demodulator.

Furthermore, the Examiner has provided no motivation to combine the teachings of Hartmann and MacLellan. All that is provided in the rejection after a recitation of citations to portions of Hartmann and MacLellan is the blanket assertion that "it would have been obvious to one of ordinary skill in the art to modify Hartmann to incorporate [the claim language] so as to produce an output stream to more efficiently use the available bandwidth of a time-varying RF channel and/or to provide a flexible and adaptive digital communication system."

It is not sufficient to maintain a rejection, however, for the Examiner to simply identify each claimed element in cited references. Rejecting claims based solely on the Examiner finding corollaries for the claimed elements would permit the Examiner to reconstruct the claimed invention by picking references from diverse arts and using Appellant's invention as a blue print to make the combination, and such an approach is not permissible. The language regarding what the combination would achieve does not provide a proper motivation to combine the elements, but simply shows a description of the advantages of the disclosure in MacLellan from its abstract.

In order to prevent the use of hindsight based on the invention, the Examiner must show a motivation to combine the cited elements – some reason that a skilled artisan confronted with the same problems as the inventor and with no knowledge of the claimed invention would select the elements from the cited prior art references for combination in the manner claimed. But it is not sufficient for the Examiner to issue a simple invocation of skill in the art. If such a rote invocation were sufficient to supply a motivation to combine, most areas of technology would

rarely experience a patentable technical advance. The requirement of a suggestion to combine stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Examiner did not provide anything beyond a general assertion of motivation to combine, based on the Examiner's skill in the art, Applicant asserts that the Examiner engaged in hindsight analysis, improperly using Applicant's own claimed invention to provide the motivation to combine the cited references.

Based on at least the arguments above, the Applicants request the Examiner to withdraw the rejection of claims 70 under 35 U.S.C. 103(a) as being allegedly unpatentable over Hartmann, in view of MacLellan. Applicants respectfully traverse this rejection.

Allowable Claims

The Examiner objected to claims 13, 16-18, and 41-44 as being dependent upon a rejected base claim, but indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants acknowledge the allowability of these claims if they were amended into independent form. However, Applicants do not wish to amend these claims at the present time, since the claims they depend from are allowable for the reasons given above.

Conclusion

Accordingly, Applicants respectfully submit that the claims, as amended, clearly and patentably distinguish over the cited references of record and as such are deemed allowable. Such allowance is hereby earnestly and respectfully solicited at an early date. If the Examiner has any suggestions, comments, or questions, calls are welcome at the telephone number below.

Although it is not anticipated that any additional fees are due or payable, the Commissioner is hereby authorized to charge any fees that may be required to Deposit Account No. **50-1147**.

Respectfully Submitted,

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